

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-14 (Canceled).

Claim 15 (Currently Amended): A method for shifting a refined microstructure of a metallic material, comprising:

solidifying a molten metallic material within a cylindrical tube at a temperature lower than a liquidus of the molten metallic material to yield a solidifying molten metallic material;

vibrating the solidifying molten metallic material by simultaneously applying an alternating electric current ~~and a magnetic field simultaneously~~ at a current value less than a current value used to melt said metallic material and a magnetic field at a Tesla value approximately equal to 1.4 Tesla ~~respectively configured~~ to crush solid crystal particles of the solidifying metallic material into small pieces; and

shifting the small pieces to a surface of a surrounding interior wall of the cylindrical tube with said alternating current and said magnetic field ~~set at a current value and a Tesla value configured~~ to concentrate said refined microstructure of the metallic material in an outer periphery of the solidifying metallic material.

Claims 16-17 (Canceled).

Claim 18 (Previously Presented): The method of Claim 15, wherein the applying further comprises applying the electric current and the magnetic field during last stages of solidifying of the solidifying metallic material.

Claim 19 (Canceled).

Claim 20 (Previously Presented): The method of Claim 15, wherein the magnetic field is generated with an electromagnetic coil enveloping the metallic material.

Claim 21 (Currently Amended): The method of Claim 15, wherein said current value used to melt said metallic material is approximately 80 Amps.

~~said current value used with said Tesla value to crush solid crystal particles~~
comprises:

~~a current value less than a current value used to melt said metallic material.~~

Claim 22 (Canceled).

Claim 23 (Previously Presented): The method of Claim 15, wherein said metallic material is Al-Si alloy and said small pieces have a crystal grain diameter between 0.5 and 3 μm .

Claim 24 (Canceled).

Claim 25 (Previously Presented): The method of Claim 15, further comprising:
concentrating said metallic material in an end portion of said metallic material by
moving the metallic material within the magnetic field.